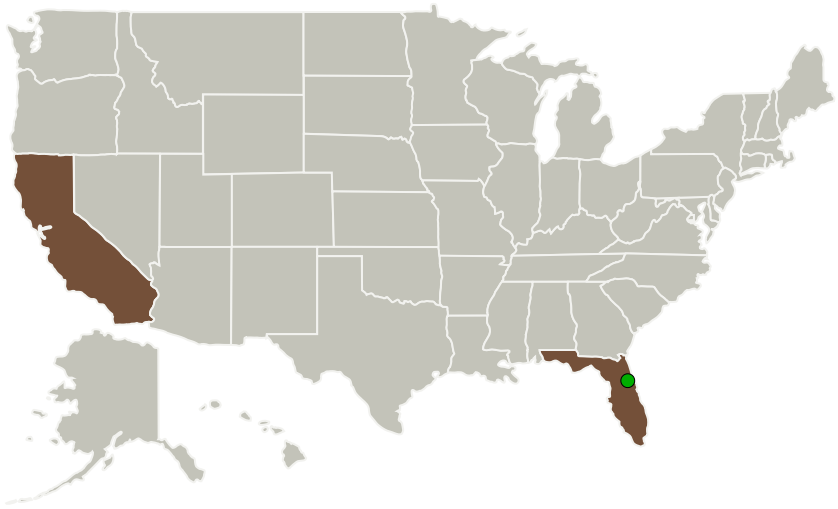
Polymer Reinforced, Non-Brittle, Light-Weight Cryogenic Insulation for Reduced Life Cycle Costs, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

InnoSense LLC (ISL) proposes to fabricate a composite aerogel foam. This material is designed to be impact resistant, non-brittle, non-water-retaining and insulating for cryogenic propellant storage tanks at a reduced life cycle cost. Since typical liquid rocket fuels consist of liquified hydrogen and oxygen, the proposed material must be able to insulate and maintain cryogenic temperatures. Here, ISL proposes to utilize traditional solvent exchange aerogel protocols to "co-foam" silica and a polymeric additive material. The composite material will maintain the thermal properties of traditional aerogels, and also exhibit an increased flexibility due to the incorporation of a porous polymer additive. The Phase I project will demonstrate that it is feasible to fabricate inexpensive, high performance cryogenic insulation foam through traditional aerogel processing techniques. In addition, this material should exhibit high mechanical performance required for fuel tank applications. Process optimization and field-testing will move forward in Phase II in collaboration with a major NASA prime contractor.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Innosense, LLC	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Torrance, California
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
California	Florida

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140558)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innosense, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

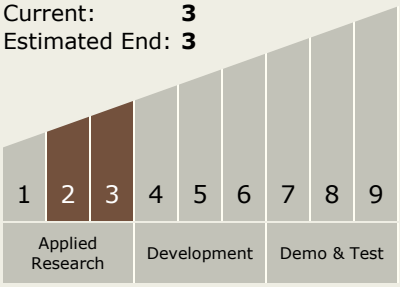
Carlos Torrez

Principal Investigator:

David C Hess

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.1 Infrastructure Optimization
    - TX13.1.7 Impact/Damage/Radiation Resistant Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System